Evolution of the Concept of Capital– A Historical Perspective

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20 May 2009

Historical roots of the twin concepts of capital[1]

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4.1 Introduction

In the previous chapter, we have considered at length the economic scenario of the present epoch and the paradoxical developments that have been identified in the economic scenario. We further identified the accumulation of financial capital as a key factor in the evolution of this finance-dominated regime. There is evidently an unprecedented growth of financial assets, commodities, markets and a rising power of the owners of financial capital, all of which can be expressed by the term 'financial capital accumulation'. However, the survey of literature on finance as presented in chapter 3 shows that there is little consideration of the term 'financial capital' in current economic literature or attempts to probe the causes behind the accumulation of financial capital.

The aim of this thesis is to probe into the causes of financial capital accumulation and analyse its consequences. To find out why and how 'financial capital' is accumulating, it is first necessary to consider the concepts of capital and financial capital in some detail. The concept of capital is indeed a very broad one, which has been the subject of varied interpretations. The concept of capital has a key place in economics as one of the two main factors of production, the other being labour. Again, physical capital accumulation and investment has been widely held by both Keynesians and Marxians to be essential for economic growth[2]. Growth theories have been shaped to a large extent by concepts of capital.

The evolution of the concept of capital is one of the most fascinating chapters in the history of economic theory. With advancement in economic life, especially in production methods and technological improvements, and the consequent refinements in economics as a discipline, the concept of capital too has broadened

[1] Part of PhD thesis titled ACCUMULATION OF FINANCIAL CAPITAL IN MACROECONOMIC SYSTEMS - AN INQUIRY INTO ITS CAUSES AND CONSEQUENCES FOR ECONOMIC GROWTH (University of Kalyani, West Bengal, Indi)

[2] Stockhammer (2004), Financialisation and the slowdown of accumulation, p.719.

in scope and developed immensely. Interestingly, this evolution has also seen several of the most interesting debates and controversies of economic theory. The very definition of the term capital has been widely debated, besides its contribution as a factor of production, its measurement, and rewards to it. In fact, just how illusive and broad the concept of capital is, can be fathomed from the fact that still now economists have yet to reach a consensus on even the domain of capital theory. As Bliss (1975) aptly put it –

> When economists reach agreement on the theory of capital they will shortly reach agreement on everything else. Happily, for those who enjoy a diversity of views and beliefs, there is very little danger of this outcome. Indeed, there is at present not even agreement as to what the subject is about[3].

Economic literature has long been grappling with two concepts of capital- physical capital and money (or finance or financial) capital. Economists have seen capital both as capital goods and as the money value embodied in the capital goods. These two diverging notions of capital have led to the confusing treatment of capital in economic theories. These two concepts have repeatedly come up in economic theories and have received varying degrees of importance in different schools of thought. What is significant is that a certain ambiguity has marked the treatment of these two concepts and there has been little explicit demarcation between the concepts. Economic literature has tried to identify the two ideas separately but an intriguing confusion has often come about in their analysis when juggling the twin concepts.

Cohen and Harcourt (2005) have pointed out that the twin notions or interpretations of capital are also the source of controversies surrounding capital theory. While most are in agreement regarding the dual nature of capital, controversy comes about when one of the notions of capital gets emphasized to the *relative* neglect of the other[4]. This chapter considers the myriad conceptions

[3] Bliss (1975), *Capital theory and the distribution of income*, p.7.
[4] Cohen &Harcourt (2005), Capital theory controversy: Scarcity, production, equilibrium and time, p.xxviii.

of capital historically with a focus on how the twin concepts have continually been mixed-up in economic theories.

Interestingly, modern discussions centering on economic growth, accumulation and capital have been much influenced by historical evolution of capital theories. The socio-cultural milieu in which any social historian finds himself invariably influences much of his thought process. Both the prevailing economic and technological conditions and his socio-cultural environment affect an economist as a social theorist. This is more than evident in writings on capital theory. The ideological and political discourses of each century have profoundly influenced contemporary and later discussions on capital theory, especially those concerning the determination of the rewards to it in the production process. It would not be an overstatement, in fact, to say that, ideology has subtly shaped the core of capital theory. As Harcourt (1972) points out –

> …Nor do I mean that ideologies necessarily affect either logic or theorems. Rather they affect the topics discussed, the manner of discussion, the assumptions chosen, the factors included or left out or inadequately stressed in arguments, comments and models, and the attitudes shown, sympathetic, or hostile, to past and contemporary economists' works and views.[5]

This chapter considers the exploration of the varied notions of capital, historically placing them in their socio-cultural background. Again, it is especially crucial for this study to ask if the concept of financial capital have been considered in economic literature and underline its demarcation from 'physical capital' concept. We also ask if the treatment of the various concepts of capital, including financial capital has been adequate. In the following sections we start our exploration from the pre-classical and classical 'fund' concept of capital in Section 2 and move onto neoclassical ideas of 'physical capital' in Section 3. Section 4 considers concepts of 'human capital' in recent endogenous growth literature while Section 5 considers the evolution of concept of 'financial capital' in economics.

4.2 The pre-classical and classical 'fund' concept of capital

[5] Harcourt (1972), *Some Cambridge controversies in the theory of capital*, p.13.

4.2.1 The pre-classical approach

The pre-classical approach generally viewed capital as the 'fund' required for the initial procurement of means of production and smooth running of the production process. The writings of social theorists before mid-eighteenth century contain little discussions on capital though an early, singular instance of such an analysis is found in the writings of Barbon (1690). He essentially saw capital as a 'stock' (of capital goods). He contended that interest is in fact, a 'rent on capital' and paid for 'stock' (a contention, which Schumpeter (1954) thought of as an intrepid one in the setting). Barbon (Ibid), in this sense set a precedent to the analysis of 'real capital', stressing that interest was for the use of the stock of goods that could be bought with the money and not for the money itself [6].

A very explicit idea of the production process and the role of capital in it is found in the writings of physiocrats. The term 'capital' was, however, not in usage. Cantillon (1755), for example, called it 'funds'– emphasizing the need for accumulated sums of money to buy stocks of goods with which to produce or in which to trade. For example, he wrote of the farmer who needs sufficient funds (*assed de fond*) to do business[7]. Evidently, as these economists were writing in a predominantly agricultural society the 'money capital' needed in agricultural production, to finance the lag between expenditure on inputs and return on output obtained, assumed much importance.

Quesnay (1766) started the trend of regarding capital as consisting of a series of 'advances' (*avances*). He used the term to mean 'money capital' (*capital d'argent*) though conceiving it to be invested in buildings, implements, stores of grains, cattle etc. He thought these to be productive, his idea being that larger advances permit the use of more productive methods. He considered livestock, building and implements (fixed or physical capital) as 'original advances' on which interest at the rate ten percent is included as depreciation in his famous *Tableau économique*. He also considers 'landlords advances' including drainage,

[6] Nitzan & Bichler (2000), Capital accumulation: Breaking the dualism of 'economics' and 'politics, p.69; Schumpeter (1954) [2006], *History of economic analysis*, p.313.

[7] Hennings (1987), Capital as a factor of production.

buildings and other permanent land improvements but they do not feature in the *Tableau*. Working capital or 'annual advances' includes wages of agricultural labourers, seeds and other recurring annual costs. Farmers from the *Tableau* are seen to use two-fifths of their own output as fixed capital, while one-fifth is sold to 'sterile' artisans in exchange for goods to replace worn out fixed capital[8]. Evidently, Quesnay (Ibid) conceives of capital as both 'money capital' advanced to farmers and 'fixed capital' when the funds are invested in the production process. The seeds of the ambivalent treatment of the two concepts of capital are already sown in his ideas, which will continue in the analysis of his successors.

Reflections along the same lines permeate the writings of Turgot (1770) who generalized Quesnay's theory and developed a specific theory of capital– as a factor of production. Turgot (1770) defined capital as 'accumulated values' and pointed out that advances for running of the production process are paid out of capital. Undoubtedly, he was referring to 'money or finance capital' as key ingredient in the production process. Money capital is required because production is roundabout and thus needs capital goods as well as original factors of production. There is, however, no clear exposition of whether he was regarding the 'advances' themselves as productive or regarding the capital goods representing them as 'productive'. He further contended that accounting for the various degrees of risk involved, the rates of return on all possible investments are equalized by competition between owners of various 'capitals' (he uses the plural, *capitaux*). Therefore, rate of interest acted as 'a kind of thermometer' of the abundance or scarcity of capital in a country[9].

4.2.2 The classical view

Regarded as the first modern school of economic thought, classical economics includes writings of the likes of Adam Smith, David Ricardo, Thomas Malthus, and John Stuart Mill– the publication of Adam Smith's *An inquiry into the nature and causes of the wealth of nations* in 1776 being taken as the beginning of classical era. The classical economists were trying to represent the rapidly

[8] Blaug (1996), *Economic theory in retrospect*, pp.26-27; Hennings (1987), Ibid.
[9] Hennings (1987), Ibid.

industrializing economy that they were witnessing so there was an added effort to incorporate 'produced means of production' or capital goods in their analyses. However, as Hicks (1965) points out, the basic tool of analysis remained the static equilibrium framework. In fact, this adherence to a framework in which equilibrium in some sense prevails is a distinct feature of capital theories after the late eighteenth century. The static method is made to be applicable by the simplifying assumptions of circulating capital and single capital good, making the single period self-contained. Interestingly, Hicks (Ibid) identified Adam Smith (1776) and the static character of his model as the main features of the 'classical age', that he sees as the 'anti-Keynesian revolution'[10].

4.2.2.1 *Smithian ideas*

Adam Smith (1776) was keenly interested in the causes behind economic progress and since there is an important connection between capital and economic growth and development, this led him to analyze the contribution of capital to growth[11]. Though aware of and writing about the implications of the rapid industrialization that was occurring, he was, in fact, viewing capital in a predominantly agricultural society and this gave rise to some crucial features of his model.

Smith (1776) considered capital accumulation as the origin of economic progress. He distinguished clearly between fixed and circulating capital, emphasizing the different proportions of fixed and working capital needed in different industries. Smith (Ibid) pointed out that circulating capital consisted of raw materials and semi finished goods that yield a return to their owners by being sold or capable of being sold in the course of a productive cycle. This is in contrast to fixed capital goods, which invariably take part in the production process without changing hands and consists of implements, buildings and also 'human capital' (the capital value of the 'acquired and useful habits of all members of society'). Blaug (1996) points out that while later on, many economic writers have seen circulating capital in money value, Smith treats them in real terms. Blaug (Ibid) opines that

[10] Hicks (1965), Ibid, p. 41.
[11] Ibid.

the Smithian analysis of capital finds resonance in the Austrian concept of capital as a stock of unfinished goods that permits the producer to span the time interval between the application of inputs and the emergence of final output[12].

In the agrarian (or 'corn' economy) that he assumed, the capital stock comprises of a 'wage fund' (in terms of corn) necessary to keep the society going until the next harvest. The average wage rate or the real wages per worker is then the total product of the corn divided by the number of labourers. Growth in this economy depends on the number of workers, and on productivity (the amount of corn produced, on the average, by each worker), with the rate of growth varying inversely as the wage rate and directly as average productivity. Economic growth entails wage fund growing faster than population. Smith (Ibid) further believed average productivity would increase over time owing to division of labour, leading to a rise in wage rate. Economic growth and capital accumulation, in turn, made division of labour possible. Thus, saving was essential for growth and earning of profits the result of both capital accumulation and division of labour[13].

A kind of diminishing returns is identified in the eventual exhaustion of investment opportunities for extending division of labour, leading Smith (Ibid) to advocate free trade. In this one-commodity, subsistence fund economy neither the valuation of capital nor does its durability play any role. Moreover, though Smith (Ibid) acknowledges that production is a time-consuming process, time does not play any role in the valuation of capital and output here. Again, as Hicks (1965) points out, Smith paid no attention to plans and expectations, leading to a neglect of uncertainty and liquidity, so that the link between real and monetary theory remained unbuilt[14].

4.2.2.2 *Ricardo's approach*

The Smithian ideas of capital stayed on with Ricardo (1772-1823), who tried hard to maintain the Smithian self-contained single period. The assumption of homogenous capital had made it possible for Smith to apply the static method.

[12] Blaug (1996), Ibid, p.52.
[13] Lewin (1999), *Capital in disequilibrium: The role of capital in changing world*, pp. 50-51.
[14] Lewin (1999), Ibid, p.52; Hicks (1965), *Capital and growth*, p. 42.

For Ricardo (Ibid), writing in the more industrialized economy, this assumption was difficult to retain as machinery had started playing an important part in the economy[15].

But Hicks (1965) points out —

> ...The self-containedness of the single period was nevertheless so powerful an instrument, and so much depended upon it, that Herculean efforts were made to retain it[16].

Not surprisingly, then, Ricardo resorted to the labour theory of value, which served to bring all economic goods to a common denominator. Reducing capital to its labour content made it possible to retain the homogeneity assumption.

Ricardo (1817) used 'labour hour' as a unit of measurement so that labour time became the standard of comparison. It is possible to reduce a stock of circulating capital, which get used up in the one-period horizon, to its labour content by calculating the hours of labour it took to produce it and get a value for the input. However, the same method is not applicable for fixed capital, which lasts beyond the single-period framework. Ricardo (Ibid) solves this problem by regarding fixed capital as circulating capital, which circulates more slowly, since some part of the fixed capital is getting used up each year. In other words, all capital stock rotate, it is only a matter of level. In this way, it is possible to calculate the value of inputs of any capital item that matures in any given year and compare it to the value of its outputs in that year, and thus calculate a rate of return[17].

Ricardo (1817) was mainly concerned with distribution of income between the various categories of inputs and their owners and it was in this context that he tried to give an account of the earnings of capital. His main argument was that a capitalist society in the long run establishes a uniform rate of profit. Unlike Smith (1776), he made productivity of labour to depend on output. The rising food prices following the Napoleonic blockade led him to probe the long-term trend of an economy in which population was rising. The rising population, he contended,

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[15] Hicks (1965), Ibid, p. 47.
[16] Ibid.
[17] Lewin (1999), Ibid, p.53.

would serve to keep the wage rate at the subsistence level. Since population was growing, this would lead to the use of land of progressively inferior quality. Ricardo (Ibid) explicitly introduced diminishing returns to the scarce factor– that is land, a point not found in Smithian analysis. As wage rate was fixed at the subsistence level, margin of production being extended to inferior land would lead to a rise in the earnings (rent) of landowners of intra-marginal land. As a result, the rate of profit was bound to fall, and when it reaches zero, capital accumulation is bound to stop. This point is referred to as the stationary state, which can be avoided only with technological innovations, improvements in agriculture and international trade[18].

The non-agricultural sector analysis is, however, the weak point of Ricardo (1817)'s analysis, which became difficult to fit in the pattern of single-period self-containedness. A major drawback in Ricardo (Ibid)'s proposition is that competition would maintain the same rate of profit throughout the economy, in agricultural and non-agricultural sectors alike[19]. It must be underlined that in Ricardian theory, human action is depended on to bring about the equilibrium already assumed. It is held that the economy knows the areas of high and low profitability. If some capital undertaking were found unprofitable, capital would be withdrawn and invested elsewhere. However, physical durable capital could be withdrawn very slowly and no change should occur in this long process of it being shifted from areas of low to high profitability. The economy is assumed to find a way (in some way or the other) to reach the correct configuration of capital items at which the rate of profit is the maximum possible and uniform. This, indeed, as pointed out by Lewin (1999), is unlikely in a world of unexpected and continuous changes. Evidently in treating capital goods in that manner, Ricardo followed Smith in confusing between 'capital fund', which is homogenous and can be easily withdrawn and 'capital goods', which are specific, durable and heterogeneous. Moreover, static method can only be suitable in comparing static equilibria, and even these devices could not make it suitable for the analysis of a

[18] Lewin (1999), Ibid, p.54.
[19] Hicks (1965), Ibid, p.42.

dynamic process[20]. Thus, the study of equilibrium conditions led to the analysis of stationary conditions.

Classical economists succeeding Ricardo continued their analysis along the same lines. Both James Mill(1821) and John Rae (1834) used the term 'instruments' when emphasizing capital goods but continued to speak of it as money capital. They considered the role of capital goods in production process, thus maintaining a 'real capital' doctrine, while implicitly treating capital as a 'fund'[21]. The static equilibrium tools were clearly insufficient in dealing with the role of 'capital goods' in the production process but this was hardly avoided in the neoclassical era that followed. Classical economists produced their 'magnificent dynamics' during a period in which capitalism was emerging from a feudal society and in which the industrial revolution was leading to vast changes in society. The classical school was active into the mid nineteenth century and was followed by neoclassical economics in Britain beginning around 1870, which began to consider the 'physical capital' concept.

To sum up, while the pre-classical writers saw capital as a 'fund', the classical era was marked by the confusing juxtaposition of the 'fund' concept with the concept of capital as 'physical capital'. The classical economists considered 'capital goods' to be crucial in the production process, though they implicitly continued to analyse the concept in terms of 'fund' or money capital. The static equilibrium tools they used are generally held to be responsible for such shortcomings. With the coming of the neoclassical era, emphasis shifted to 'physical capital', with Austrian economics, the first major neoclassical school of thought trying to form a temporal theory of production to properly explain the unique role of capital goods in the time-consuming production process.

4.2.2.3 *Capital in Marxian analysis*

It would be interesting now to focus on the different facets of capital that have emerged in the writings of Karl Marx (1867), the nineteenth century philosopher, political economists and revolutionary who remains till date, one of the most

[20] Lewin (1999), Ibid, p.55.
[21] Hicks (1965), Ibid, p.47.

influential and controversial figures in academic and political circles. The Marxian concepts of capital deserve discussion here because not only does Marx stands in historical time in the crucial period of transition from classical to Neoclassical economics, but also because the economic roots of Marx's analysis lie in classical political economy. Again, interestingly Marxian economics faced the first systematic challenge from one of the pioneering branches of neoclassical literature, the Austrian School of liberal economists. The Marxian concept of capital in fact encompasses the several facets of capital that have come before and after in economic theory.

Marx (1867) was writing in the second half of the nineteenth century when the Industrial Revolution had come to its full fruition and this historical setting was influential in the development of his concepts. Interestingly, while the classical 'fund' concept of capital is inherent in the Marxian concept of capital, the 'physical capital' concept (that later on, the neoclassical school stressed) also found its early representation in his writings as 'constant capital'.

However, it was the concept of 'variable capital' that in Marxian analysis gets more prominence as the sole source of value in the production process. In doing so, Marx (Ibid) remains true to his Classical political economy roots, given that the key role of human labour ('variable capital' in Marxian terminology) in production process was much acknowledged in Smith (1776)'s ideas. This concept reappears in later writings variously as 'entrepreneurial ability', 'human capital' etc. finding the most explicit treatment as a source of economic growth in endogenous growth theory. The Marxian concept of capital is, thus, an encompassing one, containing both the ideas of the predecessors of Marx as well as the roots of many manifestations of capital that have come in writings of later day economists.

The concept of capital in Marxian ideas stems from the use of money capital, which is the 'fund' with which the capitalist begins the process of production. Marx recognized that capital must essentially begin as a 'fund' or pool of resources, which later takes on definite forms in the capitalist production process. For Marx (1867), capital represented both the stock of commodities and the sum

of values. Moreover, he insisted that capital goods are 'capital' only in the capitalist society, thereby using the term to describe particular organization of production in the society[22]. The first form is essentially that of 'physical capital', which Marx denotes as, or 'Non-reproductive Capital' or 'Constant Capital'. This includes the means of production, raw materials, and auxiliary raw materials, etc. which do not undergo any quantitative alteration of value in the production process. They are simply used up in the production process— their intrinsic labour values being transmitted to the product being manufactured, but they do not add any value of their own to the product[23].

'Variable capital' is accorded more prominence as the sole creator of 'surplus value' in production process. The idea of human effort or labour— skilled and unskilled, as another form of capital in the production process is implicit in Smithian theory and finds explicit representation in Marxian ideas. 'Variable Capital' is thus that part of capital, which reproduces the equivalent of its own value and also produces an excess or surplus value which itself varies. It is the sole source of 'surplus value' as it creates value greater than its 'exchange value'. Surplus value is created solely by labour power and appropriated solely by the capitalist— as in purchasing from the workers his labour power, the capitalist, in fact, purchases all the fruits of his labour power[24].

Importantly, Marx (1867) was perhaps one of the very first economic thinkers to underline the demarcation between production and financial capital. In *Capital III*, Marx (Ibid) analyses accumulation from the perspective of the distribution of surplus value and capital. According to this view, in the early stages of development, the basis for accumulation is in the concentration of capital. However, at later stages of development, centralization is the dominant method by which the use of ever-increasing sizes of capital is organized. This presupposes a credit system. Consequently, a divergence between the accumulation of capital in production and of capital in financial system is created. This is the basis of fictitious capital and can lead to the intensification of

[22] Hennings (1987), Ibid.
[23] Munro (2008), *Basic principles of Marxian economics*, pp.4-5.
[24] Munro (2008), Ibid, p.5.

economic crises. This occurs when accumulation fails to overcome the obstacles confronting the continuing expansion of the production of surplus value [25].

4.3 Physical capital and the neoclassical era

4.3.1 Neoclassical domain and priorities

Neoclassical economics is the singular element of several schools of thought in economics and is conventionally dated from the publication of William Stanley Jevons's *Theory of Political Economy* (1871), Carl Menger's *Principles of Economics* (1871), and Leon Walras's *Elements of Pure Economics* (1874). The evolution of the neoclassical school marked the birth of the marginal utility revolution in economics. With the marginal revolution, Jevons, Menger and Walras developed pure exchange models that shifted the explanation of price away from the classical difficulty-of-production focus to the neoclassical focus on utility and relative scarcity. While classical economics stressed that the value of a product depended on the costs involved in producing that product, some economists gradually began emphasizing the perceived value of a good to the consumer. In this theory, the value of a product was to be explained by differences in 'utility'. This principle, associated with philosopher and economic thinker John Stuart Mill (1806-1873) came to be called Utilitarianism. The introduction of the 'marginal theory of value' or marginalism stressed that economic actors make decisions based on the 'margins', differing from the aggregate decision making of classical political economy[26].

There is, however, a wide range of neoclassical approaches to various problem areas so that there is hardly any complete agreement on what is meant by neoclassical economics. In fact, the neoclassical domain is huge – from neoclassical theories of labour to neoclassical theories of demographic changes. The neoclassical domain in capital theory is, however marked by an attempt to encompass and consider the 'physical concept' of capital.

[25] Bottomore, Harris, Kierman & Miliband (1991), p.3.
[26] Neoclassical economics (n.d.); Cohen & Harcourt (2003), Retrospectives: Whatever happened to the Cambridge capital theory controversies?, p. 201.

As these economists were writing in a quickly industrializing society in which technological innovations had started playing a key role, stress was laid on aggregating and quantifying physical capital goods, as also analyzing what determined the returns to it in the production process. The latter was, however, a much-debated issue with ideological differences playing the key role of shaping the debates. The divergent views regarding the quantification of these capital goods also contributed to the refinements in the neoclassical theory.

While the Austrians focused keenly on the role of time in the production structure of capital goods, the believers of the production function approach (the so called neo-neoclassical school) were more concerned about the quantification of 'physical capital' goods, which could help econometric studies on macroeconomic aggregation of capital. Neo-Ricardians were however very critical of neo-neoclassical determination of the marginal product of capital and its use in explaining the rewards to capital as a factor of production. They contended that the perspective in capital theory should be from the angle of distribution theory. However, the binding factor in these different approaches was the importance accorded to physical capital– its unique characteristics and problems.

4.3.2 The Austrian school of thought

Of the several strains emanating from the neoclassical domain, which were marked by the 'physical concept' approach of capital, the Austrian school is characterized by the explicit incorporation of the role of 'time' in the production structure of goods. The concept of 'time' being one of the determinants of production is, however, quite an old one and often implicit in even the 'fund' ideas of capital. In fact, according to Ahmad (1991), Ricardo (1817) was one of the first economists in this tradition, who not only realized the importance of time structure in the production process, but also tried to incorporate it in the labour theory of value, though in a rudimentary way. Going further back, as Ahmad (Ibid) points out, Jacques Turgot (1769) conceived of capital as an advance that aids the producer over the *interval of waiting* until his own product is ready for use. William Nassau Senior (1767) had referred to 'abstinence' as being a 'cost'

of production, which ought to be compensated for – thus justifying the rate of profit on capital. Again, Wicksell (1893) tried to combine the neoclassical ideas with the Austrian view of production as a time consuming process. Ahmad (Ibid) points out that Wicksell (Ibid)'s critical contribution lies in his questioning the validity of the proposition that an increase in capital is necessarily negatively related to the rate of interest or profit[27].

4.3.2.1 *Menger – the pioneer*

The first systematic thought about capital in terms of a time structure, however, came with Carl Menger (1871) one of the co-founders [along with Jevons (1871) in England and Walrus (1874-77) in France] of the marginalist tradition. Lewin (1999) points out though Böhm-Bawerk (1889) is regarded by many as the 'father' of Austrian capital theory and as being the first to bring in the concept of time and its implications into considerations of capital, this view essentially overlooks the contribution of Menger. Even though he wrote little on capital, his work laid the foundation of a 'comprehensive theory' on capital[28].

Menger (1871)'s concept of capital stressed the utility of capital as capital goods or 'physical capital', though he also considered money capital as equally important in the production process. Menger (Ibid)'s curiosity in the time structure of production was in the ordering of goods according to the stage in which they entered into the production process, and the implications of this, for the theory of value. Capital goods are of different types but can be classified by where they fit, along a time range, into the production process. Moreover, in accordance with the marginalist tradition, the value of goods of higher order is without exception determined by the prospective value of the goods of lower order in whose production they are used[29]. Changes in the demand for any consumption good, goods of lower order, will then change the evaluation and use

[27] Ahmad (1991), *Capital in economic theory: Neoclassical, Cambridge, and chaos*, pp.117-120.
[28] Lewin (1999), Ibid, p.117.
[29] Ahmad (1991), Ibid, pp.117-118.

of particular capital goods used in their production. Menger believed that the market could accomplish this task smoothly[30].

It must be mentioned that Stanley Jevons (1871) also tried to incorporate time in measuring capital –specifically 'physical capital', in a quantitative, cardinal way. Jevons (Ibid) tried to obtain a measure of capital that combined the effect of both the quantity of input used as capital, and the length of time for which it was used. His concept of the 'average time of investment' was later generalized by Böhm-Bawerk (1889) into the well-known concept of the 'average period of production'– the part of Böhm-Bawerk (Ibid)'s contribution, which for many, is the linchpin of Austrian capital theory[31].

4.3.2.2 *Böhm-Bawerk on capital and his legacy*

Böhm-Bawerk (1889) wrote extensively on the different aspects of capital theory, which, as Lewin (1999) points out, formed a substantial part of his life's work. As Lewin (1999) points out besides Jevons' idea of the 'average time of investment', he was much influenced by both Mengerian and Ricardian concepts. The concept of the 'average period of production' was an attempt on Böhm-Bawerk's part to incorporate the Mengerian concept of time in the production process using a quantifiable concept[32].

Böhm-Bawerk (1889) insisted that capital goods are not intrinsically productive– it is the production processes that they make possible that lays at the origin of any increase in value that arises. There is a connection between the length of production, specified by the number of stages involved (the degree of 'roundaboutness') and the degree of productiveness that results. However, capitalist roundaboutness though productive, is time-consuming. By properly selecting more roundabout methods of production, increments to value are obtained but these need to be weighed against the 'cost' of waiting. Moreover, he

[30] Lewin (1999), Ibid, pp.57-58.
[31] Ahmad (1991), Ibid, pp.118-19.
[32] Lewin (1999), Ibid, pp. 58-59 & 67-68.

postulated that the returns to greater degrees of roundaboutness must eventually diminish[33].

To give a precise meaning to this concept of roundaboutness and formalize his analysis, Böhm-Bawerk (1889) introduces the concept of 'average period of production'. It has been criticised that with this concept, Böhm-Bawerk (Ibid)'s discerning discussion of the nature of capitalist production process turned increasingly dependent on produced means of production and was reduced to a limited formula. By using it in the way he did, Böhm-Bawerk (Ibid) led to the development of a mechanical production function. It also implied that production time could be used as a measure of capital itself and, therefore, of capital intensity. Though it actually was a small part of his total work, it got much prominence and influenced to a great extent later capital theory[34].

Böhm-Bawerk (1889) attempted to overcome the measurement problem of capital goods by the concept of roundaboutness in production. In his theory, the roundaboutness of the production process was turned into a variable, which was chosen by profit maximizing entrepreneurs subject to a given amount of money capital. Lewin (1999) has pointed out that capital theorists, in general, have stressed the Ricardian elements (as opposed to the Mengerian elements) of Böhm-Bawerk's theory[35]. Marshall (1890), on the other hand, following Menger (1888) distinguished between capital goods that earned quasi-rents and money capital that earns interest. Thus in very classical tradition, he reserved a place for money capital alongside capital goods. Again, Wicksteed (1894) gave equal importance to all factors of production including capital goods[36]. Like Wicksteed, Clark (1899) gave equal prominence to all factors of production, but strongly criticized Böhm-Bawerk's attempt to incorporate the Mengerian vision using a quantifiable concept, as meaningless and suggested a view of capital in which time, as we know it, plays no part at all. Capital, for Clark (Ibid), is a 'permanent' fund yielding a flow of income and a capitalist economy one in which capital plays this role. Knight (1936) held similar ideas– besides stressing the 'fund'

[33] Lewin (1999), Ibid, pp. 59-62.
[34] Lewin (1999), Ibid, pp. 62-71.
[35] Lewin (1999), Ibid, p.59.
[36] Hennings (1987), Ibid.

concept of capital; he criticized the incorporation of the idea of time in the production process. Knight (Ibid) pointed out that the period of production, as applied to the economy as a whole, is always infinite or always zero, according to the perspective adopted. Since the infrastructure of capital goods dates back to the beginnings of human history, the first concept essentially suggests that there is no such thing as origin of the period of production. The second idea sees time intervals as irrelevant as we can conceive of the production process as stretching back into the very beginnings of human history and forward into the timeless future, so that the production process itself appears timeless[37].

Lewin (1999) has pointed out that this view is valid only for an economy, which has reached a state of stationary equilibrium, in which the capital stock has been built up, is properly maintained, and yields a continuous income, excess of the maintenance cost. Even in case of a simultaneous and perfectly synchronized production process, considerations of the time structure and the decisions related to it will be crucial. Actually, Clark (1899) and Knight (1936)'s emphasis on these technical and logical aspects of the 'period of production' turned the focus from real economic issues to abstract technical issues. The period of production as an objective construct may be inherently problematic, but it is hardly necessary for understanding that different consumption goods are or was available at different times and that the capital structure implies a time structure of production[38].

4.3.2.3 *Hicks and his 'neo-Austrian' approach*

The modern Austrian (market process) theorists have focused on some of Böhm-Bawerk (1889)'s less formal assertions, drawing crucial insights from them. However, before going into details of this Austrian approach on capital, it would be useful to consider first the 'neo Austrian' approach of J.R Hicks that came with the publication of his *Capital and Time* (1973). Hicks (1904-1989) wrote extensively on capital including three very influential books and numerous articles. He defied categorization, as Lewin (1999) points out, he was

[37] Lewin (1999), Ibid, pp.65-67.
[38] Hennings (1987), Ibid.

> …at once Keynesian, neoclassical and, in his verbal remarks, if not in his formal models, he made important concessions to Austrians[39].

Hicks (1973) turned to the question of measurement of capital in *Capital and Time*. He insisted, in crucial difference from Austrians, that for macroeconomic purposes the 'single measure' of capital does have some utility[40]. In this context, he defined the 'value' and 'volume' measure of capital. The 'value' measure considered the value of capital in terms of any chosen good (generally the good in terms of which 'income' is measured). In other words, it considered the present value of the stream of returns imputable to that capital. The 'volume' measure, again, should ideally ensure that a given number of machines of a particular type always counts as a constant amount (units) of capital[41].

Hicks (1973) pointed out that there are several limitations with each kind of measurement, each being "a little out of focus"[42]. It is to overcome these empirical limitations in the two measure of capital, that Hicks (Ibid) turned to the 'forward' and 'backward' measures. While, the 'forward' measure could easily be related to the 'value' measure of capital, to relate the 'volume' measure with the 'backward' measure is more difficult. Ahmad (1991) pointed out that the value of a good in a multiproduct or multi-period world may change even when its volume does not change. The Austrians insist that the same physical good at different points of time is not also the 'same good' in the economic sense. Again, the value measure of the same volume of capital in terms of its output can be different depending on a number of considerations, including that of rate of interest[43].

Hicks (1939) in *Value and Capital* also presented a model of temporary equilibrium, which was much influenced directly by Hayek (1928)'s notion of intertemporal coordination, the trend that probably reached its culmination with the Arrow-Debreu model of intertemporal equilibrium. Hicks (Ibid) showed that

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[39] Lewin (1999), Ibid, p.86.
[40] Hicks (1973), *Capital and time*, p.151.
[41] Ahmad (1991), Ibid, p.127.
[42] Hicks (1973), Ibid, p.156.
[43] Ahmad (1991), Ibid, pp. 128-130.

a necessary condition for the viability of any process as a whole is that its capital value should be positive (or at least non–negative) at every stage of its life. Hicks (Ibid) made explicit how present value criterions change over time, i.e. over the life of the project[44].

4.3.2.4 *Evolution of the modern Austrian school*

Modern Austrians, according to Krizner (1976) follow Mises (1956) in asserting that the very concept of aggregation of individual capital goods is meaningless. Mises objected strongly to the ambiguous notion of a measurable stock of capital. He also distinguished clearly between capital funds (money capital) and capital goods (real capital)[45]. *Capital goods* are unfinished consumer goods, which are arranged from higher order to lower order depending upon how close they are to the finished product. As the capital goods are a heterogeneous grouping of unfinished goods, only the entrepreneur is able to decide what is and what is not a capital good; that decision, in turn, depending upon his plans for their future use. *Capital*, on the other hand, is purely an accounting concept and is equal to the market value of all assets minus the market value of liabilities of a business organization. It is useful only as a means of calculating the profitability of an enterprise and of aiding the entrepreneur in his decision-making[46].

The concept of capital, thus, is strictly a tool for economic calculation and hence has meaning only in the context of a market in which monetary calculation is meaningful. As Krizner (1976) pointed out, Mises' (1966) unhappiness with the Böhm-Bawerkian notion of capital reflected the Austrian scepticism toward economic aggregates. Böhm-Bawerk (1889) defined capital as the aggregate of intermediate products (i.e., of produced means of production). This concept was criticized by Menger, who Hayek (1934) points out sought

[44] Neoclassical economics (n.d.), Ibid; Lewin (1999), Ibid, pp. 86-90.
[45] Kirzner (1976), Ludwig von Mises and the theory of capital and interest.
[46] Vaughn (1976), Critical discussion of the four papers.

to rehabilitate the abstract concept of capital as the money value of the property devoted to acquisitive purposes against the Smithian concept of the 'produced means of production[47].

In his work *Socialism*, Mises (1923) emphatically held that there is no meaning to a concept of an aggregate capital stock since one cannot aggregate a collection of heterogeneous entities. Similarly, there is no meaning to the idea of an aggregate fund of capital since the market value of the existing group of unfinished goods is subject to continual change as the carrying out of entrepreneurial plans reveals unanticipated conflicts that annul the expectations of some and exceed the expectations of others. Therefore, the calculation of the value of the capital stock of a country yields only a meaningless number that says nothing about the level of income to be expected in the future, because it says nothing about the decision-making process of the owners and users of the capital. Mises (Ibid) also denied the assigning of any productivity to capital, or any role for capital productivity in the formation of the interest rate[48].

4.3.3 The production function approach and neo-Ricardian criticism

4.3.3.1 *Neo-neoclassical approach*

Two main lines of development can be noted after the revival of interest in capital theory in the post-war period. One is the neo-neoclassical approach– the name broadly used to cover theories in which capital, taken to be an 'amorphous stock of production potential' features as an argument in a production function[49]. The other is the resurgence of the Ricardian classical approach (called variously as the neo-Ricardian or neo-Keynesian School) brought about by the contributions of Joan Robinson (1956) and Pierro Sraffa (1960), in which capital and labour are not continuously substitutable for each other[50]. The distribution of product and measurement of capital proved to be the two most contentious issues for these two schools of thought. The earnings of labour relative to capital are seen by neo-Ricardians to be determined by 'social' rather than economic

[47] Hayek (1934), Carl Menger, p. xxvi as cited in Kirzner (1976), Ibid.
[48] Vaughn(1976), Ibid.
[49] Lewin, P. (1999), Ibid, p.72.
[50] Ibid.

conditions. While the neo-neoclassical approach focused quite exclusively on 'physical concept' of capital, neo-Ricardian did ponder on the other dimensions of capital trying to bring in a comprehensive approach to the analysis of capital.

This renewed interest in capital theory led to an examination of changes in the distribution of the growing social product between the 'factors of production' and eventually led to the famous 'Cambridge controversies' in the theory of capital. Ideologies strongly influenced this technical analysis, as did differing opinions on the very appropriateness of the marginal theory of value and distribution for these issues. The adherents of the neo-neoclassical school held that the distribution theory is just another aspect of the marginal theory of value. On the contrary, the neo-Keynesians held that the theory of distribution should be analyzed in different terms from that of the neo-neoclassical theory of value and the theory of distribution should come before in context and priority the theory of value[51].

Evidently, ideological differences have been instrumental in shaping the content and loyalties in this controversy. Growth theory undoubtedly is an implicit capital theory as it includes capital (denoted commonly as K), implying some measure of the produced means of production, as a factor of production; besides, also addressing the question of distribution. Like any other factor, capital is subject to diminishing returns and will be accumulated up to a point where the value of its marginal product equals the opportunity cost of its employment. This opportunity cost is represented traditionally as the interest cost of the financing that facilitates such accumulation. The neo-neoclassical production function analysis implied that saving, by providing funds for investment, positively contributes to growth, in a measure directly related to the productivity of capital. This, in turn, provided a justification for the earnings of capital, which must be paid the value of its marginal product if it is to be wisely invested[52].

Neo-Keynesians contended that as capitalist institutions gives rise to conflict between the classes in capitalist societies; the distribution of the national product between these classes cannot be analyzed without considering the institutional

[51] Harcourt (1972). *Some Cambridge controversies in the theory of capital*, pp. 1-2.
[52] Lewin (1999), Ibid, pp.80-81.

nature of capitalism. The neo-Keynesians were also critical of the use of supply-determined models in neo-neoclassical theory, so much so that Joan Robinson, a leading neo-Keynesian called this approach 'pre-Keynesian economics after Keynes'. Neo-Ricardians attacked these conclusions by attacking the very concept of capital used in the neo-neoclassical theories, showing that any measure of capital can hardly be independent of income distribution and prices[53].

4.3.3.2 *Cambridge controversies*

The famous Cambridge Controversy is traced to Robinson's articles published in 1952-53. "The generalisation of the General Theory" (1952) and "The production function and the theory of capital" (1953) were both very critical of neo-neoclassical long run capital theory. It questioned the neo-neoclassical concepts of equilibrium, the ambiguity concerning the unit in which capital was measured in the neo-neoclassical aggregate production function, the neglect of factor supplies and technical progress and the incapability of marginal theory of value to explain relative factor shares and hence their functional distribution of income. While Robinson (Ibid) found the intuition behind the production function approach correct, she criticized the way neoclassical approach translated them into theory[54]. Distribution theory undoubtedly requires consideration of the key relation between capital –'the fund', and capital as 'physical goods' bought with 'the fund', because those who own capital as a factor consider it necessarily as a fund invested for varying lengths of time. This key relation was neglected in neo-neoclassical theory.

Robinson (1952 and 1953)'s articles reflected her discomfort not only with the static equilibrium tools, but also with this obvious neglect of the 'fund'- 'physical goods' relation in neo-neoclassical theory. Neo-neoclassical approach discussed the rate of profits earned by businesses on capital, as if profits and capital were both sums of money. Robinson (1953-54) pointed out that capital in the form of yet uninvested finance is a sum of money and so are the net receipts of

[53] Harcourt (1972), Ibid, p.3; Lewin (1999), Ibid, p.81.
[54] Birner (2002), *The Cambridge controversies in capital theory: A study in the logic of theory of development*, pp. 22-23.

businesses, but they do not co-exist at the same time. While capital is a sum of money, the profits are not being earned, and when profits are being earned, capital has ceased to be a sum of money and is a plant. There are many reasons that can cause the value of the plant to diverge from the original cost. Capital should be measured in a unit that would serve both these purposes[55].

The difficulty then was to find a unit of measurement of capital which when inserted in the production function along with labour (also suitably measured), could explain the level of aggregate output. In a perfectly competitive economy with perfect foresight, where static expectations that are always realized, the unit must be such that the partial derivative of output with respect to capital equals the reward to capital and the corresponding one with respect to labour equals the real wage of labour. Again, the concept of equilibrium was crucial to the neo-neoclassical economists who contended that equilibrium is a position towards which the economy is tending to move as time goes by. It reflected the attempt by neoclassical economists to incorporate 'time' within their analytical framework[56]. However, Robinson (1960) criticized this very idea, as according to her, the neoclassical economist thinks of a position of equilibrium as a position towards which an economy is tending to move as time goes by. She pointed out that it is impossible for a system to get into a position of equilibrium, for the very nature of equilibrium is that the system is that the system is already in it, and has been in it for a certain length of time[57].

Robinson (1933) contended that the neo-neoclassical way of looking at the problem directed interest away from the factors that determine growth of capital and labour, and from how technical advances affect growth, accumulation, and income shares. Robinson (Ibid)'s interest in capital theory also lay in analyzing the role of the choice of techniques of production in investment decision. In fact, one of the main assumptions of her model, elucidated in The *Accumulation of Capital* (1956) is the availability of only one technique of production at any

[55] Harcourt (1972), Ibid, pp.18-20.
[56] Harcourt (1972), Ibid, pp.18-23.
[57] Robinson (1953-4),The production function and the theory of capital, pp. 81-106 as quoted in Skott (2004), Mythical ages and methodological strictures — Joan Robinson's contributions to the theory of economic growth, p.2.

moment of time. Harcourt (1972) has opined that the removal of this assumption of cross-section choice of technique helps her in bringing out the profound importance of real wage for the potential surplus available at any moment of time. It helped to consider the saving aspect whereby consumption is foregone and the investment aspect whereby the real wage determines the command of a given amount of saving over labour power to be used in the investment goods sector. The productivity of labour and past real wage levels are crucial as the former makes the (past) choices of techniques relevant, and the latter determines the expectations formed because of them, and these, in turn, affect vitally the processes of production and accumulation[58.]

Robinson (1953-54) also proposed a measure of capital in terms of labour time, which would incorporate the idea of capital goods as aids to production. She measured the stock of capital goods – physical capital in her terminology, in wage units. In equilibrium, the value of physical capital in terms of output, which is referred to as capital, equals the cost of the wage bill expended in the past compounded at the rate of interest. This capital measure in wage units is called 'real capital'. Intentionally it was not independent of distribution and prices also but did allow factor prices and marginal products to be related in a simple way. More importantly, it allowed comparison of the magnitudes of key variables– capital-output, capital-labour ratios– in different equilibrium situations. The comparisons arose as either the wage rate or the rate of profits was assigned arbitrary values and the equilibrium values corresponding to them were calculated[59].

Champernowne (1953-54) though accepting the logic of Robinson (1953-54)'s measure of capital, found it to have some disadvantages, one of the major one being the lack of a one-to-one correspondence between output and the amount of capital. Champernowne (Ibid) constructed an alternative measure– the chain index measure that links the quantity of capital in all equilibrium situations. However, when Champernowne (Ibid) examined whether a model using this chain index measure is indeed free from the anomalies of Robinson (Ibid)'s

[58] Harcourt (1972), Ibid, p.17.
[59] Harcourt (1972), Ibid, p.4.

measure, he found out that it is not. Champernowne (Ibid) had to make some additional assumptions which were later questioned when the 'Reswitching' controversy came to the forefront[60].

By the publication of the *Accumulation of Capital* in 1956, Robinson had turned the study criticizing the defects on Neo-neoclassical production function into a systematic and detailed theory of capital accumulation. In accordance to her research program, Robinson (1956) presented the book as an extension of the Keynesian short-run analysis to the theory of the development of capitalist economy in the long run[61].

4.3.3.3 *Reswitching and capital reversal*

One of the most crucial of the criticisms levelled against the Neo-neoclassical marginal analysis are those concerned with 'reswitching' and 'capital reversing' – a issue that reached its culmination with the 1966 symposium in the *Quarterly Journal of Economics*[62]. Both the concepts– 'reswitching' and 'capital reversing' were used to attack the very idea of neo-neoclassical concept of capital– specifically its use as an argument in the production function.

The definition and explanation of the two ideas is necessary to appreciate the debate that has come to become almost synonymous to capital theory itself. For this, it would be useful to consider first the neoclassical take on capital in the one-commodity aggregate production function model, developed by Samuelson (1962). Under assumptions of exogenously given resources and technology, constant returns to scale, diminishing marginal productivity and competitive equilibrium, this model will exhibit three key results that were named by Samuelson (Ibid) as the three 'parables'[63]. Fist, the real return on capital (the rate of interest) is determined by the technical properties of the diminishing marginal productivity of capital. Secondly, a greater quantity of capital leads to a lower marginal product of additional capital and thus to a lower rate of interest. Finally,

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[60] Birner (2002), Ibid, pp. 38-41.
[61] Birner (2002), Ibid, p.41.
[62] *Quarterly Journal of Economics*. November, 80 (4).
[63] Samuelson **(**1962), Parable and realism in capital theory: The surrogate production function, as cited in Cohen & Harcourt (2003), Ibid, p.201.

the distribution of income between labourers and capitalists is explained by relative factor scarcities or supplies and marginal products[64].

Cohen and Harcourt (2003) pointed out that the parables or results in this one-commodity model crucially depend on the physical conception of capital for their one-way causation between changes in factor quantities and changes in factor prices. The problem arises with consideration of heterogeneous capital goods in more general models. Heterogeneous capital goods cannot be measured and aggregated in physical units, as Wicksell (1911) had pointed out, and their values (measured either as the cost of production or present value of the future outputs they produce) must be used. Since either of these the measure involves time, it presumes a rate of interest, determined in a one-way manner by the quantity of capital in a simple model. This additional circularity, or interdependence, causes what is known as the 'Wicksell effects' and reswitching and capital-reversing were essentially the problems created for the neoclassical parables by these Wicksell effects. Reswitching occurs when the same technique (a particular physical capital/labour ratio) is preferred at two or more rates of interest while other techniques are preferred at intermediate rates. At lower values of the interest rate, the cost minimizing technique "switches" from *a* to *b* and then ("reswitches") back to *a*. The same physical technique is associated with two different interest rates, violating the first and second neoclassical 'parables'. With capital-reversing, a lower capital/labour ratio is associated with a lower interest rate. In comparing two steady-state equilibrium positions, it appears as though capital services have a *lower* price when capital is 'more scarce' implying that the demand curve for capital is *not* always downward sloping. This will violate the second and third parables. Both evidently strike at the very basis of the neo-neoclassical concepts and analysis and naturally the neo-neoclassical put in several defences of their position[65].

Three major attempts in neoclassical defence can be pointed out from 1955 to 1966. First, Swan (1956) tried to remove the problem of heterogeneous capital goods by assuming an all-purpose commodity to be used as a primary unit (the

[64] Cohen & Harcourt (2003), Ibid, p.201.
[65] Cohen and Harcourt (2003), Ibid, pp.201-202.

famous meccano set, the pieces of which can be timelessly and costlessly reshaped into appropriate quantities of 'capital') which allows capital to be measurable in its own unit. Thus, Swan (Ibid) succeeded in avoiding the two most disturbing features of 'physical capital' (from the point of view of its measurement) – specificity and heterogeneity. Swan (Ibid) further contended that, in analyzing the process of accumulation over time, Champernowne (1953-54)'s chain index measure of capital is peculiarly suited to deal with the Neo-neoclassical procedure of considering notional changes at equilibrium points in the stationary state. Robinson (1953-54), of course disputed this, pointing out that the comparison of equilibrium points with one another is not the appropriate tool for analysis of out-of-equilibrium processes or changes and reflects the failure of neo-neoclassical methods to deal with the problems of 'time'[66].

Solow (1963) in theoretical defence of the neoclassical position attempted to avoid problems of capital by focusing on the rate of return on investment using the Fisherian concept of rate of return over cost. He contended that the concept of 'rate of return on investment' would enable one to use the neo-neoclassical approach irrespective of the reswitching. Pasinetti (1969, 1970) argued that this approach would provide an intuitively satisfying explanation of the rate of return *only if* an 'unobtrusive postulate' that disallowed capital-reversing was introduced into the analysis, although Solow (1970) disputed this. Solow (1972) denied the use of any such postulate – a claim supported by Dougherty (1972)[67]

The third attempt was put forward by Samuelson (1961-62). Samuelson (1962) introduced the 'surrogate production function' which included what appeared to be a variety of physically distinct capital goods, but he also assumed equal factor proportions in all industries, making relative prices independent of changes in distribution between wages and profits. As Samuelson subsequently realized, this effectively collapsed his model back to one commodity. He contended that if goods produced have the same capital intensity, 'reswitching' cannot take place. This case of 'equal organic composition of capital' was conceded by the neo-

[66] Swan (1956), Economic growth and capital accumulation, as cited in Cohen, and Harcourt (2003), Ibid, p.205;Harcourt (1972), Ibid, p.5.
[67] Cohen & Harcourt (2003), Ibid, pp. 205-6; Ahmad (1991), Ibid, p.251.

Ricardians but they pointed out that from the point of view of production such goods were essentially the same good, so that reswitching obviously cannot occur[68].

The most well-known claim however came from Levhari (1965) who contended that if the economy is indecomposable, i.e. one in which every single output requires directly or indirectly as input for its production, something positive of every single other output, 'reswitching' and 'capital reversing' cannot occur. This claim was widely debated and led to the Symposium in 1966 of *Quarterly Journal of Economics* that included papers by Passinetti, Levhari-Samuelson, Morishima, Bruno-Burmeister-Sheshinski, Garegani and Samuelson. This was taken to be a serious defence of the neo-neoclassical position as such an indecomposibility could be claimed for an advanced economy, more so since indirect effects were also allowed. The debate for the time culminated with the Samuelson-Levhari paper (1966) which stated that the proposition is invalid. The controversies were, however far from being over though the neo-Ricardians with their technical skill succeeded in convincing the neo-neoclassicals that from a technical standpoint, 'reswitching' and 'capital reversing' were indeed possibilities. More importantly, a purely physical measure of capital was indeed not possible in a multi-commodity world where incomes and prices vary. The neo-neoclassical economists, in turn urged for the use of the production function on practical grounds in empirical works[69].

Lewin (1999), however, pointed out that the neo-Ricardian criticism leaves much to be desired. In fact, neither of the two approaches raises any questions relating to the availability or use of knowledge or expectations regarding production techniques. The Ricardian assumption of a uniform rate of profit on capital invested being equal to the rate of interest, is used by both, allowing them to talk about capital earnings as interest or profits, as equivalent things. There is an implicit presumption that all economic agents share knowledge about investment opportunities so that the capital markets are at all times fully arbitraged. There is no possibility of differences and inconsistencies in plans and valuations. He has

[68] Cohen & Harcourt (2003), Ibid, p.206; Ahmad (1991), Ibid, p.251.
[69] Ahmad (1991), Ibid, pp.250-251.

pointed out that the relevance of the models used is very questionable for handling the real world issues that the two approaches seemed to be dealing with. While the neo-neoclassical economists concentrated on the degree of 'substitutability' between inputs and the neo-Ricardians assumed such 'substitutability' to be low, but neither of them questioned the relevance of their framework to the actual market process[70].

By the late 1960s, Samuelson (1966) conceded that outside of one-commodity models, reswitching and capital-reversing may be the usual theoretical results and that the three neoclassical parables are not 'universally valid'[71]. Cohen and Harcourt (2003) have contended that on a theoretical level, 'English' Cambridge had won the round over aggregate production functions. Even neoclassicals like Hahn (1972) have been critical of aggregate production functions, which are logically inconsistent with general equilibrium theory. Consequently, neoclassical production functions fell into disfavour in the 1970s and early 1980s until their revival with endogenous growth and real business cycle theories[72].

4.3.3.4 *Further developments*

However, aggregate production functions using the idea of aggregate capital have been used in not only the pure theory of value, but also in post-war econometric studies like that of Arrow, Chenery, Minhas and Solow (1961). These represented different ways of using the concept of disembodied technical change to make empirical estimates of productivity growth over time, or comparisons between industries and economies of differences in the rate of growth of productivity. This idea of disembodied technical progress, again, succeeded in abstracting from the specificity and heterogeneity of capital goods and the difficulty arising from the fact that capital is either a fund yet to be invested or specific capital goods but never both simultaneously[73].

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[70] Lewin (1999), Ibid, pp.82-83.
[71] Samuelson (1966), A summing up, as cited in Cohen, and Harcourt (2003), Ibid, p.206.
[72] Cohen & Harcourt (2003), Ibid, p.206.
[73] Harcourt (1972), Ibid, pp.6.

It is in response to these considerations that 'vintage models' came to be developed from late 1950s– the pioneering models being that of Salter (1960) and Johansen (1959,1961). They incorporated the idea that, with reference to a given stock of capital goods, while capital-labour substitutions are possibilities before investment decisions are made ex ante, they are no longer possible in the ex post situation when production and pricing decisions have been taken. These models have been applied both in the pure theory of growth and empirical work on productivity change over time. The refinements of this approach focused rather exclusively on making the measurement of physical capital suitable to the neo-neoclassical methods of analysis. These include the discussions by Jorgenson and Griliches (1966, 1967) of the concept of 'total factor productivity'. It involved a hypothesis to remove 'technical progress' as such from the explanation of productivity growth to allow an explanation entirely in terms of traditional neo-neoclassical 'factors of production' now 'suitably' and 'correctly' measured[74].

Again, with the coming of 'general equilibrium' models since the 1960s the neoclassical parables have been under further criticism. General equilibrium models sustained the general neoclassical principle of explaining all prices, including factor prices, by relative scarcity, in that prices are determined by preferences, endowments and technology, and factor returns are *equal to* or *measured by* disaggregated marginal products. However, the proponents of this approach pointed out that 'general equilibrium' theory gives no support to the neoclassical inverse, monotonic relation between the quantity of capital and the rate of interest. Moreover, the general equilibrium approach reconsidered Joan Robinson's concerns about equilibrium finding no particular support in favour of the stability of the general equilibrium outcome.[75]

Evidently, 'physical concept' of capital dominated much of the neoclassical analysis though the 'fund' concept came back implicitly in their theories as they tried to formulate a measure of physical capital. Thus, capital often became a homogenous mass in trying to avoid the heterogeneity and specificity of capital

[74] Harcourt (1972), Ibid, p.7.
[75] Cohen & Harcourt (2003), Ibid, pp.206-207.

goods, and 'fund' and 'physical concept' often got blurred. While, the Austrian school tried to make the Classical analysis more precise in the form of a temporal theory of production, the neo-neoclassical approach, in turn tried to develop an atemporal theory of production by sacrificing the heterogeneity and time element, so that again capital was reduced to 'capital value'. The neo-Ricardian criticism of the neo-neoclassical approach failed to consider its own limitations concerning the framework of analysis. Neo-neoclassical theory also tends to compartmentalize for sake of convenience— analysing growth theory separately from macroeconomic theory and theories of business stock. Exclusive focus in especially neo-neoclassical literature on 'physical capital' turned the focus on abstract 'technical issues' that neglected the other crucial issues in capital theory.

4.4 Transition to the 'Human Capital' concept

4.4.1 Human capital and endogenous growth literature

The concept of 'human capital' (the stock of productive skills, technical knowledge, education, and experience intrinsic in labour as a factor of production) has always featured in discourses on capital theory, implicitly and explicitly. It is understood that the intrinsic qualities of labour is the essential ingredient of any productive activity and its key role in production of goods and services hardly needs to be reaffirmed. Nevertheless, the importance given to human capital and its distinguishing qualities has not been the same in all economic theories. In discourses on capital, while some economic traditions like the neo-neoclassical approach, have treated it as just 'labour'– another argument in production function utilizing the vital productive capacity of (physical) 'capital', Marxian economics have looked upon it as the source of value in the production process yielding profits to the capitalists. The term appears in Marx (1859)'s article in the New-York Daily Tribune article where the term is used to describe humans who act like a capital to the producers[76]. The contributions of human capital, in fact, have been discussed since the very conception of economics as a branch distinct from political economy. While earlier theories

[76] Marx (1859), *The Emancipation Question* in New-York Daily Tribune, January 17 and 22, 1859 as cited in Human Capital (n.d.). Enclyopedia of wikipedia.

toyed with the ideas of organization, entrepreneurship playing essential functions in production process, it was only with the coming of the endogenous growth theory in late twentieth century that human capital got a systematic and explicit treatment as a source of 'endogenous' growth in economies.

The idea of 'human capital' playing a vital role in economic activities first came up in writings of Adam Smith (1776). He recognized it as one of the four types of fixed capital (fixed capital being characterized as that which affords a revenue or profit without changing masters), defining 'human capital' as the 'the acquired and useful abilities of all the inhabitants of any society'[77]. The term 'human capital' was used by A.C. Pigou (1928) who distinguished between investment in 'human capital' and investment in 'material capital'. He pointed out that once this distinction was recognized, the difference between an economy in consumption and economy in investment becomes blurred as consumption is, up to a point, investment in personal productive capacity[78]. The first systematic consideration of 'human capital' however, came with A.W. Lewis' (1954) publication of *Economic development with unlimited supplies of labour*. Lewis (Ibid) pointed out classical economists generally assumed an unlimited supply of labour at the subsistence wage rate and then questioned how production grows over time. Classical systems thus determined simultaneously income distribution and income growth with lesser stress on relative prices of commodities. However, in the neoclassical era, labour was no longer assumed to be of unlimited supply and there was a major focus on the determination of prices. While such an assumption suited the Western economies, where labour by that time was indeed limited in supply, in the greater part of Asia, labour was unlimited in supply. The problems of countries with surplus populations were hardly considered by the neoclassical economists (even from Asia) in this era. Lewis (Ibid) focused on analyzing economic development in economies with unlimited supplies of labour[79].

4.4.2. Human capital in labour economics

[77] Human Capital (n.d.), Enclyopedia of wikipedia Wikipedia.
[78] Pigou (1928), *A study in public finance*, p. 29 as cited in Human Capital (n.d.), Ibid.
[79] Lewis (1954), Economic development with unlimited supplies of labour, pp.400-401.

The first use of the concept in neo-neoclassical era came with Jacob Miner (1958)'s pioneering article "Investment in human capital and personal income distribution". Miner (Ibid) is generally regarded as the father of modern labour economics. Miner (Ibid) and Gary Becker (1964) belonged to the 'Chicago school of economics' and together they helped to develop the empirical foundations of 'human capital theory', revolutionizing labour economics[80]. Noble laureate Gary Becker in his book *Human Capital* (1964) highlighted the fact that human capital is also a means of production like physical capital, and additional investment in human capital yields additional output. However, unlike land and or fixed capital, it is not transferable, though it is substitutable[81]. Becker (1962) pointed out that income growth studies have increasingly shown that intangible resources like knowledge possessed play a key role in explaining inequality in income distribution among people. Formal education, training and health are the most important investments in human capital and a key factor determining higher incomes. Becker (Ibid) pointed out that there are many ways to invest including schooling, on-the job training, medical care etc and each differ in their relative effects on income and consumption. However, all of these improve the physical and mental abilities of people and thereby raise real income prospects[82]. Many empirical studies in the United States pointed out that high school and college education greatly raise a person's income (even after netting out the direct and indirect costs of schooling and adjusting for the fact that the people with more education tend to have higher Intelligent Quotients (IQs) and better-educated, richer parents)[83]. However, some labour economists criticized this theory pointing out that this theory tries to explain differences in wages and salaries solely in terms of human capital. The concept of human capital in fact, can be infinitely elastic, including unmeasureable variables like personal character or connections with insiders (via family or fraternity)[84].

4.4.3 Endogenous growth theory and human capital

[80] Human Capital (n.d.), Enclyopedia of Wikipedia, Ibid.
[81] Ibid
[82] Becker (1962), Investment in human capital: A theoretical analysis, p.9.
[83] Becker (n.d), Human Capital,The Concise Encyclopedia of Economics.
[84] Human Capital (n.d.),Wikipedia, Ibid.

While Neo-neoclassical approach focused on 'physical capital' and thereby the problems of its aggregation and heterogeneity, two main empirical observations led to the re-examinations of the traditional categorizations and definitions of capital. The first was the lack of convergence in growth rates between rich and poor countries and the second is the fact that human capital flows to wealthy economies in pursuit of higher returns. Neo-neoclassical theory suggested that in absence of barriers to factor mobility and with competitive factor pricing, factor input ratios should tend to equality with capital flowing to its highest paid location. This will result in capital flowing to poorer nations where it is scarce, in turn producing higher rate of growth in these nations. Similarly, if same technology were available in all countries, human capital would move to places where it was scarce from places where it was abundant, and there should have been no 'human capital flight' or 'brain drain', which refers to scarce human capital moving from poorer, underdeveloped nations to developed countries[85].

Growth accounting exercises popularized by the Neo-neoclassical economists on the initial models of Solow (1956) and Swan (1956) divided economic growth into factors, most notably labour and physical capital. The residual, Total Factor Productivity (TFP), was interpreted as the growth of efficiency. The large impact of TFP growth on economic growth (on average 56.5%) found in these exercises showed that there were also other factors, which were important for economic growth though it was far from clear which factors are captured by TFP growth. These other factors were captured with social data and commonly referred to as 'human capital. While the role of the social factors was recognised, it was not clear whether they had an impact on economic growth through capital accumulation or through facilitating the adoption of technologies. Following Theodore W. Schultz (1961) and Gary Becker (1964), human capital was used to extend capital in growth accounting exercises using proxies such as 'average years of schooling of the population'. Yet, although reduced by the inclusion of human capital indicators, the share of TFP growth in economic growth remained large. Finally, no matter how correct TFP growth is estimated, it still remained to an extent exogenous as it was unclear what TFP growth is and how it influences

[85] Lewin (1999), Ibid, pp. 74-78.

Gross Domestic Product (GDP) growth making it difficult to underline whether capital growth (physical, human or both) or technology causes economic growth. With the coming of the new growth theories in the 1980s either technological growth or (human) capital accumulation was inserted in the growth model in order to explain long-run growth, thus endogenising growth[86].

Endogenous growth theory agrees with neoclassical growth theory in that technological progress is the driving force behind long-run growth. However, the departure from neoclassical theory comes with the emphasis that technological progress is itself an economic process– determined by economic factors and can be influenced by economic policy[87]. Endogenous growth theories (based on technological development) take the innovation of new technologies as the sole factor of long-run economic growth. Therefore, human capital determines to a large part the long-run performance of economies. Two branches have developed, pioneered by Lucas (1988) and Romer (1990). While Lucas (Ibid) focused on the accumulation of human capital, Romer (Ibid) focused on the stock of human capital which generates innovations. In Lucasian theory human capital is viewed as a normal input which implies that the growth of human capital should influence GDP growth, while in the Romerian theory human capital is seen as a facilitator of externalities and technology and as such the (initial) stock of human capital should influence GDP growth[88].

To explain the paradox of lack of convergence, endogenous growth theorists have focused on forces behind the technology differences. The relationship of human capital to Research and Development (R&D) expenditures and public goods has been considered. It is pointed out that innovation, of products and techniques, is inextricably linked with the manufacturing and distribution process (learning by doing), so that one producer's experience benefits another. There are external effects to the production process that is expressed in the "accumulation of 'social' knowledge", which is a non-rival input. The existence of these external effects imply the presence of increasing returns to scale and increasing returns to a single

[86] Van Leeuwen (2007), Ibid, pp.11-13.
[87] Howitt (2004), Endogenous growth, productivity and economic policy: A progress report, pp.2-3.
[88] Van Leeuwen (2007), Ibid, pp.13-15.

factor, like capital. In this case, the accumulation of capital will be self-reinforcing and not result in a decline to its marginal product, explaining the lack of convergence in real world. A further refinement has been the development of Schumpeterian growth theory that emphasizes the distinction between technological knowledge and capital, seeing the process of technological innovation as a separate activity from saving. This theory tries to understand who gains from technological progress and who loses, how the gains and losses depend on social arrangements, and how such arrangements affect society's willingness and ability to create and cope with technological change[89].

Thus, with the coming of 'endogenous growth' theory, the focus shifted form physical capital to human capital in economic literature. The focus was to account for the difference in growth experience of different nations and the key role that human skills (education, intellectual capacity and training of the workforce) played in economic growth of any nation. It must be pointed out, however, that this essentially refines our understanding of the contribution of labour as factor of production. While understanding the key role of 'human capital' in economic life is indeed necessary, the exclusive focus on the same in endogenous theory have pushed to the background considerations regarding the other forms of capital. The role of 'financial capital', infrastructural capital, social and natural capital are all important in economic life and influence key economic variables.

4.5 The concept of 'financial capital' and its evolution

4.5.1 The idea of financial capital in economic literature

'Financial capital' finds little explicit analysis in economic literature though it is one of the oldest manifestations of capital. It is surprising then that the concept of 'money capital' or 'financial capital' gets little explicit attention in economic discourses, especially in neoclassical literature. The 'fund' view of capital dominated pre-classical writings. As mentioned earlier, pre-classical writers viewed capital generally as 'funds' (Cantillon, 1755) or 'advances' (Quesnay, 1766) or 'accumulated values' (Turgot, 1770) to carry out the production

[89]Lewin (1999), Ibid: p.78; Howitt (2004), Ibid, p.4

process[90]. The 'fund' concept stressed the fact that capital was necessary as 'advances' to the production process. However, though classical writers saw capital both as 'fund' or money capital and 'physical capital', there was a confusing juxtaposition of the two concepts in their analysis. With the coming of neoclassical literature, there was however, a singular focus on physical capital. Especially in Neo-neoclassical literature, the problems of measurement of physical capital, the returns to it in the production process and controversies on technical issues took centre-stage with sporadic and isolated consideration of financial or money capital by a few economists.

One of the few economists to consider explicitly the role of money capital and 'financial capital' in the capitalist system was Karl Marx (1867). Marx (1867) pointed out that in a capitalist economy; money is at once the initiator and the finality of the social relation as expressed by the relation M-C-M$^{/}$. This relation represents accumulation and reproduction of money as capital and of *capital as money*. The major determinant of the accumulation process in a capitalist economy lies in access to money, the capacity to mobilize money as capital, and reproduction of money values. Here the surplus value comes from the use of money as capital in the production process. However, as Marx pointed out, 'finance capital' or 'interest-bearing capital', is strangely self-expanding– growing on its own accord. Marx (Ibid) holds that the relations of capital assume their most fetish-like form with the M-M circuit of interest-bearing capital, where Money creates more Money without any process bringing about the two extremes. The reproduction and accumulation of capital as money reaches its purist and most fetichised state in this relation[91].

The fictitious and fetichised nature of this relation is underlined by the fact that it is a mere anticipation of the real process of accumulation, where the surplus value generated by the use of lent money as capital is anticipated as predetermined interest payments before any real production takes place. The relation is thus a very real constraint on individual non financial capitalists

[90] Hennings (1987), Ibid, pp. 327- 333; Blaug (1996), Ibid, pp.26-27.
[91] Pineault (2001), Finance capital and the institutional foundations of capitalist finance: Theoretical elements from Marx to Minsky, pp.5-7.

because it represents debt, *i.e.* the contractual obligation to make a defined amount of money payments in the future, in exchange for 'money now, which can be mobilized as capital (spent) and invested in wages, machines and commodities. Because of its fictitious nature, this form has, according to Marx, no inner limitations and its limit can only manifest itself outside the credit relation as a financial crisis. While in pre-capitalist societies the M-M' form manifests itself as usury, in societies dominated by the capitalist mode of production the M-M' form is embodied and reproduced by the credit system as a specific commodity, as commodified money capital[92].

In Marxist literature, we find Hilferding (1910) who considered finance capital as the combination of industrial and financial capital (again consisting of commercial and bank capital). The structure of typical twentieth century regimes of capitalist finance was shown by Hilferding (1910) in his *Finance capital*. Finance capital, according to Hilferding, was a category which at the same time identified a particular form of *capital* and a new form of *capitalism.* The previously separate spheres of industrial, commercial and bank capital are now brought together by need of finance, the basis of this association being the elimination of free competition among individual capitalists by the large monopolistic cartels. To grasp this economic and social transformation in its complexity, Hilferding developed a sophisticated analysis of the institutional mutations. The institutional forms which are examined by Hilferding (Ibid) were the emerging universal banks, large manufacturing corporations and buoyant and dynamic industrial stock exchanges. Finance capital was understood by him, first and foremost, as the product of the interaction between these three institutional forms, an interaction structured by and for the circulation of liquid fictitious capital[93].

Schumpeter (1934) contended that the function of capital consisted in "procuring for the entrepreneurs the means with which to produce. It stands as a third agent necessary to production in the exchange economy *between* the entrepreneur and

[92] Ibid.
[93] Pineault (2001), Ibid, p.3

the world of goods"[94]. Evidently, the idea of capital as a means of obtaining production goods very much enshrines the fund concept of capital.

Keynes used a variety of concepts of capital in developing his arguments. In the *General Theory (*1936), he seemed to switch between capital as working capital and physical capital, depending upon whether reference was to finance or to investment. In the *Treatise* (1930*)*, on the other hand, capital most of the time appears to refer to working capital[95]. The working capital concept undoubtedly embodies the 'fund' concept as it refers to capital as resources used to smoothly run the production process or the finance required for production using 'physical capital' or 'production capital'. Keynes (1937) discussed the 'finance motive' leading to valuable insights on the same. He pointed out finance' is essentially a revolving fund that employs no savings and for the community as a whole, only a 'bookkeeping transaction'. As soon as it is expended, the lack of liquidity is automatically made good and the readiness to become temporarily illiquid is available to be used over again[96].

In Fisher (1906)'s writings, there is again an implicit fund idea that is explored. He defined capital as the stock of wealth at any point of time, wealth again being anything that is owned. The flows of services generated from wealth are then defined as income. The concept is thus very broad, as anything that generates a service or yields a benefit (whether paid for or not) is viewed as capital and the definition is smudged between capital value embodied in value of capital goods and 'physical capital' itself[97]. The relation between capital value– that enshrines the fund concept and the physical goods themselves comes in writings of neo-Ricardians also. One of the few to point out the distinction often ignored was Joan Robinson (1953). Robinson (Ibid) points out, in the context of a suitable unit for capital, that capital, in the form of yet 'uninvested' finance is a sum of money and so are the net receipts of businesses, but they do not co-exist at the same time. While capital is a sum of money, the profits are not being earned, and when profits (quasi-rents) are being earned, capital has ceased to be a sum of money

[94] Schumpeter (1934), p.117 as quoted in Taylor (2000), Ibid, p. 115.
[95] Taylor (2000), Ibid, pp. 117.
[96] Taylor (2000), Ibid, p.116.
[97] Taylor (2000), Ibid, pp.117-118.

and is a plant, so that any unit of capital should necessarily encompass the scope of both these ideas[98].

Again, in Austrian literature, there was some effort to explore the 'fund' idea of capital. Menger for example, was highly critical of Böhm-Bawerk's concept of capital as aggregate of intermediate products (of produced means of production). This concept was criticized by Menger, who wanted to stress the "abstract concept of capital as the money value of the property devoted to acquisitive purposes" against Smith's concept of the 'produced means of production'[99]. Mises following a similar tone pointed out that the concept of capital has meaning only in the context of a market in which monetary calculation is meaningful. For him, 'Capital' is purely an accounting concept and is equal to the market value of all assets minus the market value of liabilities of a business organization[100]. Mises (1823) pointed out that there is no meaning to the idea of an aggregate fund of capital since the market value of the existing group of unfinished goods is subject to continual change as the carrying out of entrepreneurial plans reveals unanticipated conflicts that annul the expectations of some and exceed the expectations of others. Therefore, the calculation of the value of the capital stock of a country is also meaningless[101].

The most explicit definition of 'financial capital' (and its distinction from 'production capital') in recent literature is perhaps provided by Perez Carlota (2002), who focuses on the 'motives and behavior' of agents possessing the capital. This distinction between physical capital and financial capital has become necessary with the growing accumulation of 'financial capital' and financial developments in the post-war era. Perez (Ibid) has contended that it is the interaction between these two types of capital and their relationship, which shapes the different phases of a technological revolution. The success of every technological revolution is, in fact, the effect of 'financial capital' and 'production capital' working together but the relation between them changes along the phases of each technological revolution. In period following the arrival

[98] Harcourt (1972), Ibid, pp. 19.
[99] Krizner, (1976), Ibid, 4.18.
[100] Vaughn (1976), Ibid, 7.7.
[101] Vaughn (1976), Ibid, 7.7. and 7.8.

of a technological revolution 'financial capital' acts as the facilitator and helps 'production capital' in spreading the revolution, cooperating with 'production capital' in creating real wealth– the 'Irruption' phase. This friendship, however, does not last long– as in the next 'Frenzy' phase, 'financial capital' with the misplaced self-confidence thinks it can thrive on its own and engages in everything (including speculation) which promises quick returns. 'Production capital' now becomes more and more dependent on 'financial capital', while 'financial capital' tries its best to break away from 'production capital' and fly to areas of quicker returns. 'Collapse' soon arrives, with 'financial capital' being brought back to reality and recognizing 'production capital' as the real wealth creator, which also marks the 'Recession' phase of the technological revolution. The next stage –'Synergy' again sees the reunion of 'financial capital' and 'production capital', both cooperating to consolidate the now mature technological revolution. However, again in 'Maturity' 'financial capital' becomes bored with decreasing returns that is now generated by 'production capital' and moves on to finance innovations that will herald the next technological revolution[102].

To sum up, there has been little explicit treatment of the concept of 'financial capital' in economic literature. It is surprising that even though ''financial capital''– as a 'fund' of surplus resources is one the earliest forms of capital in human history, there has been little analysis of capital as a 'fund of liquid resources' and its vital role in the production process. Interest bearing 'financial capital' or 'money capital' has always played a key role in the accumulation of financial wealth and hence on economic growth and development. Yet this has received scant attention in economic literature. The present era has been marked by an unprecedented accumulation of 'financial capital'– while the consequent financialisation has seen the emergence of a huge literature, the concept of 'financial capital' has remained vaguely defined in literature.

4.5.2 A discussion of the concept of financial capital

[102] Perez (2002), Ibid, pp. 73-77.

To understand the concept of 'financial capital' it is, as discussed, necessary to consider first the 'fund' concept of capital that appeared in economic literature from time to time. The 'fund' idea in economics arrived first in the pre-classical literature. However, the 'fund' attribute of capital was prevalent in the very first primitive economy. In the primitive subsistence agricultural economy, surplus food grains were required for fulfilling consumption needs while the primitive implements or 'capital goods' were being produced. This can be considered as the first from of capital, or the 'fund of resources' that in turn made possible the production of primitive implements. Similarly, even for the primitive hunting and gathering economy that preceded the primitive subsistence agricultural economy, the 'fund of food' was necessary for the production of primitive hunting instruments— the primitive 'production capital'.

With development of the economy and emergence of property rights, agricultural production came to be organized on a larger scale for non-subsistence purposes[103]. In such an economy, the 'wage fund' consisted of surplus consumption goods, which were used as wages for hired labour for both agricultural production and non-agricultural production (example of implements and tools). In this economy, there will also be subsistence farmers who again would need a fund of consumption goods to allow for the maintenance and production of basic implements. Thus, in the non-monetary ancient economy a 'fund of resources' was always needed for the smooth functioning of the production process. This evidently is the earliest form of 'capital', which in turn, allowed production of primitive 'capital goods'.

With further development of the economy there will arise a section or group of people who specialize in lending the 'fund of resources' to others who either organize production or produce commodities by their own efforts. This fund is vital to ensure the smooth running of the production process. The next stage in evolution is definitely the development of trade and commerce and further a functioning credit system as needs of the economy increase. The mercantile class

[103] The word non-subsistence highlights the fact that production may not have been for market. Indeed hoarding of food grains would be a more feasible motive for landowners in this society.

emerges who specialize in lending the 'fund' for both production purposes and trade. This mercantile class, to facilitate both lending activities and trade, which required movement over considerable distances, innovated to represent the 'fund' in intangible, disembodied form. A 'fund' of consumption items or for the matter any embodied goods would clearly be unsuitable for a functioning credit system or trade.

Historical records suggest that credits and debits are two thousand years older than the oldest known coins, which appeared only in the seventh century B.C. Written records of credit, which acted as kind of bills of exchange, were also prevalent before the emergence of coinage. Historical evidence has suggested that most 'commerce' from the earliest of times were conducted on the basis of credits and debits, rather than precious metals. Innes (1913) has pointed out that the principal instrument of commerce in early Europe for many centuries was the 'tally'- a stick of squared hazel-wood that was notched in a certain way to indicate the amount of the purchase or debt. It was created when the buyer became a debtor by accepting a good or service from a seller who automatically became the creditor. The name of the debtor and the date of transaction was written on two opposite sides of the stick, which was then split in such a way that the notches were cut in half and the name and date appeared on both pieces of the tally. The creditor retained the longer piece ('stock') and the debtor retained the smaller piece (stub). When the debtor cleared his debts, the two pieces of tally were matched to verify the amount of the debt. Importantly, these tallies would circulate acting as transferable, negotiable instruments. The 'stock' was used by creditors to purchase goods and services or to clear their own debtors. By means of these tallies, purchases of goods were done, loans were made and debts were cleared. The constant creation of credit and debits and their extinction by cancellation against one another formed the whole mechanism of commerce[104].

As the mercantile class tried to find a intangible, disembodied form to represent the 'fund of resources', the written records of credit or 'bills of exchange' emerged to facilitate both lending and trade and commerce. 'Bills' representing

[104] Tymiogne andWray (2006), Money: An alternative story, p:7; Innes (1913), What is money? , pp.394-396 as cited in Tymiogne and Wray (2006), Ibid, p.6

'fund' of resources is essentially a primitive form of 'financial capital', having all attributes of 'financial capital' as will be seen shortly. While a 'fund' of consumption items or any other good is partly concrete and less liquid, 'financial capital' even in the primitive form was disembodied and liquid.

Further evolution may or may not indeed lead to the emergence of a 'universally accepted means of payment' or money which acts as a store of value and allows the smooth working of credit, trade and commerce. The neoclassical contention of money arising to overcome the problems of barter is very much away from the historical evolution of money. Indeed as Tymiogne and Wray (2006) point out, coins appear to have originated as 'pay tokens', being mere tokens of the Crown's debt and imposed by State on its subjects to ease payment of taxes[105]. 'Financial capital' not only precedes money capital, but is also the first form of money. With the coming of 'money', credit transactions were carried on in terms of money and 'money capital' emerged as a specific form of 'financial capital'. The main function of 'money capital' like 'financial capital' is to facilitate the production process. However, 'money capital' or 'financial capital' is seldom constrained by needs of production economy and tends to accumulate and multiply independently of real production activities. It is the disembodied nature of 'financial capital' that allows the 'means and processes' used by its owners to make it multiply. These means and processes may be a particular type of accounting system, particular kinds of financial instruments or even particular ways of conducting trade.

With development of trade and commercial activity, 'mercantile capital' emerged as the most important form of interest bearing 'financial capital'. However, with coming of the industrial economy and the evolution of the corporate economy as a form of organisation of production, 'financial capital' acquired new dimensions. The business sector that arrived with the coming of the 'industrial age'[106], held a part of the output as a stock of goods. Capital goods produced are

[105] Tymiogne & Wray (2006), pp.7-8.

[106] The term 'revolution' is avoided here as it suggests a sudden change in techniques and methods of production at a particular time. Indeed industrial revolution would cover a period of many years marked by slow and gradual changes in techniques and organisation of production.

also retained by the business sector as fixed assets. Moreover, a part of the labour is always engaged in producing capital goods (new or for replacement of the old) that are retained by the business sector as fixed assets. In the balance sheet of firms this stock of goods is shown as assets and simultaneously leads to *creation* of 'nominal reserves' which are entered as liabilities. Depreciation charged and repayments of loans lead to creation of further nominal reserves, a feature characteristic of the corporate economy. These nominal reserves and the features of the balance sheet of the firms should be considered in attempting to explore the concept of 'financial capital'. These considerations have been explored in attempting to define 'financial capital' in Chapter VII of the present work.

In identifying 'financial capital' with 'means and processes' used by its owners to make it multiply, we augment on Perez (2002) who defines 'financial capital' as representing "the *criteria and behaviour* of those agents who possess wealth in the form of money or other paper assets" [Italics added]. Again, the term 'production capital' "embodies the motives and behaviours of those agents who generate *new* wealth by producing goods or performing services". The stress is evidently on the "*motives and criteria* that lead certain people to perform – or hire others to perform – a particular function in the process of wealth creation within the capitalist system"[107]. We add to this in iterating that the particular organisation of the production process has a key role in shaping 'financial capital', as does the peculiar nature of the financial instruments. Hence, we identify 'financial capital' by its intangible nature as opposed to 'production capital' that is embodied and illiquid.

Perez (2002) in contrasting 'financial capital' with 'production capital' points out that 'financial capital' is "mobile by nature while 'production capital' is tied to concrete products"[108], stressing on the liquidity of the money value of an investment in differentiating between 'financial capital' and 'production capital'. However, we contend that the money value of a capital good is unimportant once it is already a capital good. What is crucial is that the capital good is tangible

[107] Perez (2002), *Technological revolutions and 'financial capital': The dynamics of bubbles and golden ages*, p 71.
[108] Perez (2002), Ibid, p.72.

while the accounting of the same in a firms' balance sheet is intangible. Crucially, this allows for processes, which lead to financial capital accumulation. Thus, while the profits coming from a particular production process is limited by technical conditions, which are governed by the embodied nature of capital goods, accumulation of 'financial capital' is not limited. The nature of financial capital allows the employing of means that can help it accumulate.

In this context, we may also highlight the exploration of the concept by Taylor (2000) that proceeds on a similar line of reasoning as being used here. Taylor (Ibid) considered an interesting definition of capital as a stock (or a surplus), which in turn is composed of two parts– a 'fixed' (or sunk) component and a 'fluid' (or liquid) component. The 'fixed' component is represented by the *un-depreciated portion of produced means of production*, while the 'fluid' component refers to the *stock of finished goods or goods in the process of production*[109]. Equivalently, 'fluid' capital can be seen as being given by the *depreciation reserves of currently existing produced means of production plus the excess of past and current savings over past and current investment*[110].

Taylor (2000) has pointed out that the 'fixed' component defined here is evidently, what in literature is referred to as 'physical capital'. However, Taylor (Ibid)'s definition of fixed capital considers only the 'undepreciated' portion of the physical stocks of produced means of production. The 'fluid' capital again corresponds to what most writers refer to as 'circulating', 'working', or 'liquid' capital. The fluid component here represents the fund available to be drawn upon to finance and sustain investment in newly produced means of production, to fund the production of consumption goods and to fund consumption in excess of current income. The characteristic that makes it 'fluid' or 'liquid' is that it is "free to be embodied, through investment in anything, anywhere"[111]. It is thus marked by 'fungibility', while 'fixed' capital is only partly fungible. Taylor evidently is

[109] Depreciation in Taylor (2000) simply an accounting device for transforming (over some relevant horizon) sunk capital back into fluid capital. In other words, it is an instrument for effecting savings, and bears no relation to the physical wear and tear of which is referred to as 'economic depreciation'.

[110] Taylor (2000), *Capital, accumulation, and money: An integration of capital, growth, and monetary policy*, pp. 18-19.

[111] Taylor (2000), Ibid, p19.

identifying both disembodiment and liquidity as the distinguishing feature of ‘fluid capital’, which comes close to our idea of ‘financial capital’. Importantly, he stressed the fact that it is through depreciation reserves that ‘fluid capital’ is created as the amount invested in ‘sunk capital’ is recovered. This is a novel way of approaching the difficult idea of defining ‘fluid’ or ‘financial’ capital, which will be reckoned in Chapter 7 as financial capital is defined.

4.6 Conclusion

The definition of capital has evolved from the ‘fund’ concept of the pre-classical economists to a juxtaposition of the ‘fund’ idea with the concept of ‘physical capital’ in the classical era. It further evolved to a determined stress on the ‘physical capital’ concept in the neoclassical era, though the ‘fund’ concept and classical tools of analysis implicitly influenced much of the neoclassical writings. It must be pointed out that with coming of the nineteenth century, technological innovations had began fuelling rapid industrialization in Western European nations. So it is hardly surprising that with the neoclassical ‘marginal revolution’ in economics more and more stress was laid on incorporating the idea of ‘physical capital’, i.e. capital goods as means of production and on quantifying and measuring it. Debates concerning the macroeconomic aggregation and quantification of capital are, in fact, a marked feature of neo-neoclassical economics.

The concept of capital that receives the most explicit treatment in any era is, in part, influenced by the economic scenario of the era in which economists found themselves. Technological advancements and innovations (which in turn were embodied in capital goods) played a key role in the phenomenal growth process noted in the early twentieth century. The notion of capital in physical capital form, then, could hardly be ignored and the unique characteristics and problems associated with its quantification occupied the neoclassical economists considerably. In fact, attempts to analyse the role of capital goods in aiding labour in the production process surfaced even in the writings of the classical economists witnessing the first industrial revolution.

However, the paradoxical growth process being witnessed since the 1970s has resulted in attempts to bring several other dimensions of capital. It has been realised, first of all, that economic systems do have endogenous growth and secondly, that satisfactory explanation of economic growth could not be obtained in the traditional neoclassical formulations in terms of labour, physical capital, and exogenous growth of technology only. In this context several other dimensions of capital and quite a few newer definitions of capital have emerged. We see that with the transition of industrialized economies into 'knowledge based' ones and the service sector gaining more and more importance, the focus has shifted to the key role of 'human capital' in place of the erstwhile labour in economic theories. Endogenous growth theories see investment in skills and education as building up human capital or knowledge capital, and investments in intellectual property can be viewed as building up intellectual capital. Side by side, in another direction, natural capital is also finding a place in economic discussions; it is taken to be inherent in ecologies, which is protected by communities to support life. Again, the concept of infrastructure capital has also come to represent non-natural support systems that minimize need for new social trust, instruction, and natural resources. These other dimensions of capital are being evolved to shed light on the growth process seen in recent times. However, these varied dimensions of capital cannot be enclosed between the newer definitions of capital and approaches to capital theory that is emerging recently. Not only is the completeness of all these approaches still far from being established, but more importantly, the adequacy of the tools of analysis in placing these varied concepts in an overall framework is a serious problem. As a result these approaches are reaching a dead end.

Since the 1990s the focus is shifting more towards the importance of 'financial capital' and we see a revival of the earlier 'fund' notion of capital. It is an undeniable fact that the last two decades has seen an increasing influence of the financial sector and explosive accumulation of financial capital. With the arrival of the age of information and communication technology, the accumulation of 'financial capital' have proceeded unhindered and at unprecedented levels Financial markets have developed and financial commodities have come on their

own. The current focus on ‘financial capital’ undoubtedly stems from an attempt to explain such developments and analyse its consequences for economic growth. However the present literature have focused more on the intricacies of the complex nature of ‘financial capital’, which represents wealth held in form of liquid and quasi-liquid assets, representing obligations (owned by legal entities) on physical capital goods as well as financial assets.

We conclude that, keeping aside some recent attempts to highlight some other dimensions of capital essentially we have a twin concept of capital – capital as a fund and capital as produced means of production created by the funds, that is the physical or production capital. As we have mentioned, the concept that receives the most explicit treatment in any era is influenced by the economic scenario of the era in which economists find themselves. The focus has therefore tended to shift from earlier ‘fund’ notion in the pre-classical era to the ‘physical’ notion in the classical and neo-classical era of industrialisation, and then again to ‘fund’ notion in the form of financial capital in the current era of financialisation. It would therefore be more appropriate to overcome the influence of the milieu and keep the twin concept of capital for an overall analytical framework. For this purpose we need to understand the dichotomy as well as the link between the two concepts. Emergence of capital as a financial fund is essentially linked with the emergence of monetary interest. We therefore examine in the next chapter the introduction of interest in economic system and its implications.